EUGENICS AND HUMAN ECOLOGY*

By G. C. L. BERTRAM, M.A., Ph.D.

Introduction

FOR thirty-five years this Galton Lecture has been given annually in memory of that great man who both coined the term Eugenics and was this *Society's* first President. To be included in the long list of Galton lecturers, many of them persons of great distinction, makes me feel honoured above my deserts. I hope I may not fail in an effort to stimulate thoughts which will further the aims of Galton's society, our *Eugenics Society*, whose newly reissued " Statement of Objects " must surely spread far our eugenic ideals.

My paper is divided into two main parts. In the first part Eugenics and Human Ecology are defined and related, and then the peculiarities of our own species are described, followed by an insight into the complexity of our inter-relationship with our environment. The second part of the paper then deals with the actual numbers of mankind, with the concept of optimal populations, the problem of race and the differences between individuals. Finally, something is said of the difficulty of the task of Eugenists.

Eugenics and Human Ecology

I attempt this afternoon to co-ordinate and relate the two sciences, concepts or call them what you will, of Eugenics and Ecology, both of them directly concerning our own species. Further, I want to orientate Eugenics within a still wider setting, and to do that with a particular perspective. For those who have perhaps kept themselves too rigidly confined in their interests, first I will provide brief definitions of the two terms, which cover ourselves and our surroundings in the broadest terms. " Eugenics " Galton defined in 1904 as the " science which deals with all those influences that improve the inborn qualities of a race; also with those that develop them to the utmost advantage." Thought quickly shows how wide then is the scope of the Eugenist.

For Ecology I may quote Ernst Haeckel's definition in 1870. " By ecology we mean the body of knowledge concerning the economy of nature—the investigation of the total relations of the animal both to its inorganic and to its organic environment; including, above all, its friendly and inimical relations with those animals and plants with which it comes directly or indirectly into contact—in a word, ecology is the study of all those complex inter-relations referred to by Darwin " (Galton's first cousin) " as the conditions of the struggle for existence." Human Ecology is, of course, the study of Ecology as thus defined but in relationship to a single species.

From these definitions alone the linkage between Eugenics and the Ecology of our own species must be obvious: but in addition it must be clear that Eugenics encompasses not only knowledge but a purpose as well—to improve the inborn qualities of people—while Human Ecology consists of knowledge alone. This eugenic objective can only be achieved in a favourable ecological surround whose study includes what are now commonly termed the social sciences. Of course, a large part of the personal environment is filled with other members of one's own species, and the kicks and kindnesses of social life are comparable with the wind of climate and the wine of bodily satisfaction.

The width of both Eugenics and Ecology, like geography too, causes them inevitably to suffer some scorn from those of narrower disciplines. To such, Eugenics is a bastard brother to genetics and Ecology the unwanted child of zoology. But such emotions are of no real import and spring up in minds which are wedded to clear-cut categories and advance in narrow fields.

Let me remind you of the analogy of the photograph, which is each one of us. The

* The Galton Lecture delivered before the *Eugenics Society* on February 16th, 1951.

Eugenist is primarily concerned with the exposure, while the Ecologist keeps the shop where the film goes for development. Care in development may produce a fair result from a bad exposure, and even faulty development may yet permit a fine first image to appear of worth. But best results can come only from a superior first image allowed to grow under the most skilled development. Image or genes, development or environment, are similar pairs, the first attracting the Eugenist in greater degree, the second the Social Scientist or Human Ecologist. Regrettably, however, while the Eugenist is actively aware and interested, at least in some measure, in both sides of the field, it seems rare for the Human Ecologist or Social Scientist to display any real enthusiasm for the genes, and commonly too little interest even in the nourishment of the image.

Peculiarities of our Species

Now, apart from a natural self-regard, we are indeed a most interesting species to study —we are so peculiar.

Though it has not always been so, we are now, in fact, by far the most abundant of the larger mammals, indeed of animals of any kind above a quite small size. What species, next in size to man, can show 2,000 million individuals living at the same time? Can the rats do so? Perhaps the cod can. But both are far smaller than ourselves. Again, what other large species is still increasing in numbers following quadruplication over the last 300 years?

Take another aspect of our peculiarity. It is evident that the appearance and evolution of human-kind is a phenomenon of the recent past: we are a sprouting twig at the top of the phylogenetic tree. Man to-day is markedly different from his ancestors of times not distant by geological reckoning. Yet evolution within a species or group, so we believe, takes place by little steps or changes which can occur only in that ephemeral period of maturation and fusion of the gametes. With us, since we are such slow breeders by common comparison, there are but four generations to a century, so that the steps of evolution would seem not to be capable of falling faster than once every 25 years. Thus the evolution of our species, compared with most, is fast measured directly in time; it is racing if measured in generations, between which the evolutionary steps must, in fact, be unusually large. Does this encourage, or stimulate despair?

Compared with all other species our fewness of off-spring is so marked, our parental care so great, our personal development so slow. On a variety of grounds, anatomical and otherwise, some have likened us to fœtal apes, with so slow a development that we become sexually mature while still possessing various fœtal or at least juvenile attributes compared with other mammals. Our heads and brains are remarkably spherical and youthfully large in proportion, and our cranial axis remains at right angles to our long axis. There is connection here with our upright posture, the freeing of our forelimbs from the needs of locomotion, and the presence of binocular vision. We even parasitize cattle so that we can enjoy milk long past infancy.

We are generalized mammals, and we are large. That is of great importance. Our large size and relatively unspecialized form, simple pentadactyl limbs and upright carriage, allow us physically, as well as mentally, to outstrip our fellow mammals. Puny our bodies are not. True we cannot swim like seals or run like deer, but in a general integration we surpass all other mammals in our ability to traverse at reasonable speeds a great variety of different terrains—we swim, we run, we climb—water, ice, rocks, earth, trees, all can be surmounted. The next most skilful large mammal I believe to be the polar bear, a swimmer, runner and climber of real ability.

Man's body is tough and adaptable, and that, linked to a superior brain, brings him to a position of dominance which is remarkable. It is salutary to remember, however, that in shaping the topography of the earth it is the most humble of animals, the Foraminifera and the corals, which have the greatest and most lasting influence.

But in many other ways we follow the normal animal pattern, in our bodily appetites and in the guiding and controlling factors of our lives. Our individual growth and population growth follow the normal curves: till very recently our populations were controlled in the usual way by density-dependent factors: the factors of mortality, readjusted as they may be by medical philanthropy and war, are throughout most of the world of standard type.

Interaction with Environment

Of course, the interaction between ourselves and our environment has very many facets, depending on factors which are multitudinous. Some of these factors are under our own control or could be under our own control if we so willed, while others are quite beyond human interference though sometimes predictable. What is controllable or controlled in respect of one group or section of human-kind is not necessarily so in respect of another: the incidence of smallpox in Britain and in Arabia is an example; so is the differing availability of breadgrain to a rich and to a poor importing country. Mortality by thunderbolts is never likely either to be predictable or controllable, while certain aspects of the weather are already to some degree predictable and may one day be controllable. The factors in this interaction between ourselves and our environment are, in fact, astonishing in their abundance, variety and degree of controllability. For example, the further melting of polar ice, probably inevitable and uncontrollable, could raise world sea levels by another 100 feet or more, overwhelming a large proportion of the population of the earth. The changing sources and control of energy have repercussions which may seem overwhelming. The social results of the spread of the potato and of television are alike remarkable. In this general connection, further, we should note our influence, which could largely be controlled and rationalized, on the world's flora and fauna; we should note both the spoliation and the conservation and production, with all their aspects, material, biological and æsthetic too. We cultivate, we modify by breeding our domestic animals and plants, we exert various degrees of control upon some of our crop pests and diseases and upon some of those which afflict directly our own persons.

All of us peculiar beings, each with his own personal gene content, personality and aspirations, are set in this vast ecological frame to some of whose facets I have drawn fleeting attention.

Total and Optimal Populations

I have now outlined, as it were, some features of the back-cloth. In the foreground leaps ever upwards the advancing figure of world population. The reasons for this leaping are well known to you and fortunately are becoming daily more widely appreciated. That, of course, is the state of the total of our human species—a net annual increase which is estimated to surpass 20 million each year. The differing position of the many subdivisions of human-kind in their individual population cycles just magnifies the complexity, increases the dangers of partial understanding and multiplies the difficulty of solution.

We live to-day in a strange medley of fast-increasing numbers on the world scale and of diminishing replacement rates in advanced nations. Excess numbers, backwardness, hunger and disease glare across the gulf at technological advance, plenty and medical philanthropy which are, in large measure, both their cause and their cure. Ignorance, and lack of a vision wide enough to encompass the whole, leads to emotional conflict between groups, to optimistic reliance on this or that single panacea and to special pleading. Advanced nations with recent low replacement rates seek selected migrants from other nations equally forward in diminished reproduction, and do so for perfectly good reasons of compatibility and tradition, while spurning the excess hordes from spawning India. Kindly people from advanced nations diminish, with the weapons of modern prophylactic medicine, the mortality of the backward at speeds excessive in

comparison with the slow increase of food production. Philanthropy and economics, with opposed systems of distribution of resources, vie with one another for the control of the stomachs of the masses.

Here, indeed, is a medley of forces and factors quite capable of confusing all but those whose vision is wider than the average. This is the pudding from which the plum must be extracted; this is the brew from which the essence must be distilled. The trouble is that our peculiarity, or more honestly called our stupidity, so far has never allowed most people to realize for our own species what is so abundantly obvious for both wild animals and domestic animals. So far few recognize the validity of an optimal population for living within any particular environmental framework. Even when the concept of an optimum has been achieved, rarely indeed does that concept extend beyond the single criterion of food or standard economics. Yet within any particular environmental framework there must be in fact an optimal population relative to whatever criterion is held supreme, be it economic, nutritional, educational or spiritual. Further, the optimum may perhaps vary, even within the same environmental framework and with the same priority list of desirable criteria, according to the gene content of the particular population in question. For example, there may well be fundamental genetic differences concerned with gregariousness: there may be real differences here between, shall we say, Norwegian farmers and Levantine labourers. The complexity of such concepts does not detract from their reality.

An Aim Essential

The theoretical discussion of optimal populations is, however, somewhat barren. It can become pregnant with understanding so soon as we attempt to integrate the desirable criteria and express them as an agreed aim. As a precursor to actual agreement I have suggested an aim which should surely achieve some wide acceptance. Surely our goal should be a state of affairs in which every individual shall have the opportunity to develop to the full, in the service of his fellows, all the talents with which he is endowed, physical, mental and spiritual. When that is our aim we shall soon realize that the optimal population which will allow approach towards it by no means necessarily will involve immensely high standards of material well-being, and one may guess that population density will be moderate. Remember the benefit which so many achieve through periods of solitude in the waste places of the earth.

Even when the validity of this line of reasoning is accepted, that is not the end of the story; very far from it, for, as I have said, the gene content of populations, even populations of equal size, varies very greatly. But if only a general aim could be consciously appreciated, a general aim which will allow within it some difference of more closely conceived or doctrinal aim based on differing religion, then some progress could be made. Yet any progress will be beset by immense problems and I propose to deal, in a moment, briefly with three of them.

Another Human Peculiarity

First of all, however, it is necessary to remind you that there are still further important peculiarities of our species which so far I have deliberately left aside. Alone we have speech and are capable of passing experience from one to another in writing; alone we have a highly developed consciousness of self, a moral sense, even a sense of destiny, a free will and an aim, though that often is blurred by circumstances. Finally, we can deliberately control our reproduction. That is of immense and saving importance. In contraceptive practice we have a means of directing the future for good or ill.

The Control of Numbers

I said I would deal with three particular problems: these must be solved if we are ever to approach the aim I have suggested as likely to be acceptable to most. The first of these problems concerns the control of

total population and eventual limitation to optimal ranges.

I do not understand its origin but there does seem to afflict so many people, even the most educated, a distaste amounting to a wilful blindness even for the recognition of population dynamics and the inevitability of change. Yet if one seeks a worthy goal, even if one seeks a less worthy goal such as a maximum of material well-being alone, then almost at once, if the mind is not peculiarly blinkered, surely must come the appreciation of the reality of an optimal population for a culture group, an economic conglomeration, a nation or the world. It should be equally evident, if the mind is allowed to roam and possess and appreciate the evidence, that optimal populations do not appear by magic, by waiting, or by unchecked reproduction but can only emerge by taking thought and finally appropriate action. At once, as so often in man's affairs, comes then the problem of personal freedom and the free expression of personal conscience. Man reaches his greatest stature by the right use of his individual free will. Self-imposed restraint is the highest expression of freedom—the use of free will to seek a consciously appreciated goal in the general interest. This is true in all things, including the multiplication of our species. It concerns intimately any approach to those optimal numbers in the several parts of the world, or the world as a whole, which shall eventually allow the full development of all the attributes of all men. It is a far cry, and crisis in numbers is upon us now.

How much, it may properly be asked, do the crises in political and public affairs, within nations and between nations, derive from the unconscious but perhaps inevitable repercussions of unsuitable population densities within the present frame of life. High population density in itself brings great and seemingly inevitable changes in the behaviour of lemmings, and even in the anatomy of locusts : it may be so in ourselves too, and those changes cannot be considered desirable. That remains a fascinating if future field for research. Meanwhile, to the west we have the seeming leaders of mankind, far advanced in their own population cycles and turning a blind eye to the reality of the concept of optimal population, and to the east the reproductive torrent in mighty spate. Gerald Heard has described it thus :

> Few sights so quickly staunch humanitarianism and stun humanism as the mere sight of too many human beings—just seeing how many human beings there actually are. The spate of life proliferating along the Ganges : the fecund density which spreads in China like a fungous growth mantling even the broad rivers themselves ; there the actual triumph of the life force, the actual biological achievement of *Homo sapiens*, stir neither loyalty nor hope. . . . There is an awkward disregarded balance between quantity and quality. Not only does gold's value depend on its rarity : it is the same, at base, with bread. Beyond sufficiency, plenty simply collapses into glut. And life, too, the most precious of possessions, it also can be debased by the cheapening caused by unrestrained, unbalanced quantity.

The Problem of Race

Having dealt with numbers, the next immediate problem is that of race which recently has so teased the conscience of U.N.E.S.C.O. that there has been an abortive attempt to propound new doctrine. It seems perhaps unfair, but it is a fact, that we are born, equal perhaps in ultimate spiritual worth, equal in the right to freedom and opportunity, but so unequal in our genetic make up, so unequal in our personal attributes. In this connection reference must be made to Galton's *Hereditary Genius*, written in 1869 and recently re-published at the instigation of this *Society*, where for the first time the genetic aspects of eminence in many fields was clearly demonstrated.

Let us boldly face this matter of race, if that term may still be used despite its imprecision and its attendant emotional, anthropological and other glosses. Of course, there are different races in the world, as any travelled and observant child of five will explain to you. They have different appearances, features, colour and so on, and 90 per cent of the people of the world can by a child be put into one or other of four categories, usually denoted by their skin colour. The analysis of figures for a single measurable

physical attribute may not conveniently determine the same major or minor categories as does the, perhaps subjective but none the less real, integration of many features.

Attempts to classify living people, and peoples, by mental attributes or educable potentialities lead to still less significant or happy results. It is not for me to enter into discussion of the worth or otherwise of the recent pronouncements by the U.N.E.S.C.O. panel and the more recent denunciation of certain of those pronouncements by anthropologists and others. My main point here is to stress that genetic differences, physical, mental, physiological and otherwise, are expectable between different geographical groups of our own species as they are between particular groups of other species of animal covering a wide geographical range. Geographical groups in any species may be well- or ill-defined, and there will almost inevitably be overlap and intergrade, most breeding within the group and some interbreeding with neighbouring groups. Remember both that modern taxonomy is based on phylogenetic assumptions and that the general ease of so-called natural classification is considered as evidence of evolution. Our own species, man, within which all individuals appear to be fertile one with another, clearly would be abnormal if there were not obvious genetic groupings. In insects we break down populations so far as to say that there are, for example, so-called biological races, similar in anatomy but differing in some aspect of habit, commonly a food habit. The result is an obvious tendency normally to mate within the particular biological race, though abnormal matings outside it remain fertile. Whatever the interplay of genes and environment the existence of biological races in insects is real.

So is it, I suggest, with our own species. There *are* groupings of a genetic nature, which are commonly further differentiated by habit, upbringing, culture or call it what you will. To each one of us usually our own precise little ways of speech, feeding habits, social graces and so on seem so much the normal that we feel an oddness and a distaste for the ways of others. Thus it comes about that, in general, like breeds with like. But because of that ingrained feeling that each one of us is the normal and that the other fellow who is different is the abnormal, we are only too prone to relate our own estimate of normality with propriety, with quality and with superiority. Thus we can interpret the presence of emotional barriers between our groupings. They are entirely expectable, and respectable, in any swiftly evolving species: the members of a particular group in general have an innate distaste for matings between that group and another. What is so reprehensible in ourselves is that we have failed to understand the situation and in consequence too frequently are filled with an evil emotion, not simply a recognition of a difference and an appreciation of sameness, but an evil emotion involving ideas of relative superiority and worth as between races. We have been sufficiently dull-witted to make these subjective integrations of worth even in the absence of equality of educational, social and dietary opportunity. We have inflamed emotions which, I suggest, will far more quickly be suppressed by an honest appreciation of actual differences and of natural breeding barriers than by any attempts to evade the issues, or any pretence that man is not divided into sub-sections separated by perfectly normal barriers of considerable variety and strength.

Personal Differences—the Core of Eugenics

So, thirdly, in our consideration of the vast besetting problems, we come to the central core of Eugenics, the recognition of differences in quality between individuals, and the hope that by one means or another future generations may come to consist of higher proportions of those possessed of the more desirable attributes. Many may feel that in a world of obviously and continuously increasing complexity no effort must be spared to increase the proportion of the wise, and thereby, in all probability, gradually to increase the capacity for individual wisdom. Sadly, evidence has recently been adduced suggesting, if now

proving, something of the reverse trend in our schoolchildren. Wisdom must be increased and that cannot be done by education and experience alone—they can do no more than allow potentialities to develop.

These differences in innate qualities between ourselves in one sense seem so unfair, yet at the same time they provide the means to a worthy humility in realization of the talents of the other fellow, some of which we have in minor degree, some of which we seem to lack completely. There have been, and there still are, many who, in their first youth, feel that they personally are the equal, at least mentally, of all men, if they would but exert themselves. But, of course, it is not so mentally, just as so clearly it is not so physically. But with all the various types of attribute, the transmission of quality from one generation to another is surely demonstrable, if not always as simply as some would like. The process of biological transmission is largely obscured by environmental influences, nutritional, social, educational and so on. And, though we improve, by no means yet is there equal opportunity for all in these environmental or ecological factors. But, in this connection, let us always spurn the false doctrine of equal shares for all men in all things: that is nonsense. The aim, I repeat, is equality of opportunity in an environment capable of allowing each to develop to the full his every attribute.

It is the awareness of aim at this stage which is paramount in importance and yet so sadly lacking. Further, the aim must be truly worthy, not just a seeking after personal contentment, though that perhaps is a true reflection of fitting into the environment in the purely animal sense.

Conclusion

Thus I have attempted to define and to relate Eugenics and Human Ecology to one another. I have tried to show that we belong to a species which is peculiar in many of its attributes. I have drawn attention to some of the complexities of the interaction between ourselves and our environment. Further complexities become overwhelmingly evident when we considered the total numbers of our species and the significance of optimal populations. Then came the realization that there must be a widely acceptable aim, and that such an aim involves provision for the full development of all the attributes of a free individual. I then stressed another great peculiarity of man, the ability to control reproduction. So we passed to the consideration of three particular problems; numbers, race and personal differences.

Finally, we must realize that most of these problems are easily soluble by dictators, but soluble in a way which is damnable. The task of liberal Eugenists is inevitably a difficult one, difficult for the very reason that they are so fully embued with the liberal spirit, convinced both of the sanctity of human life and the worth of the individual free will. Therefore it is that they must rely on education (which has been defined as "that kind of culture which survives the forgetting of facts"). They must rely on the education of those who are born, so leading to the birth only of those with a sufficiency of worthy attributes, and then only in numbers which will allow the population to lie within an optimal range.

The aim of Eugenists, and their striving towards that aim with the aid of moral qualities, makes, to my mind, very apt for remembrance that quotation from Thucydides taken by General Smuts for his rectorial address at St. Andrews.

"In freedom lies happiness, and in courage lies freedom."

That should be the motto of all leaders to-day, and Eugenists must indeed be leaders.

Mr. Cecil Binney, in moving a vote of thanks to the lecturer, said that he had never listened to a lecture at any of the *Society's* meetings with greater interest as the lecturer had referred to such a large number of matters in which he himself was particularly interested; it was unfortunate that he had not had time to develop all these. For example, Dr. Bertram's remarks on the polar bear reminded him that he had recently, though with no zoological knowledge, been considering the question, which of the

animals would have been most likely to obtain the mastery of the world in the absence of human beings or creatures of a similar type. He thought the lecturer overestimated the value of being able to swim; it was more important to be able to hold things. The horse was a noble animal and formed for speed, but, as any young child who rode a pony could see, was confined to level ground, whereas the cat could go anywhere. Kittens could play with a ball of wool, while a horse could not, and the paws of such animals could conceivably be developed into hands. The elephant, though having the advantage of a trunk, was too large and cumbersome. On the other hand the rodents were too small. Passing from the animal to the vegetable kingdom, Mr. Binney regretted that the lecturer had not had time to develop the theme of the influence of the potato on the human race. The influence of plants on human history was a subject of great interest. Professor Myres had pointed out that the position of the Greek colonies was governed by the possibility of growing the olive tree. If it had been possible to grow this in England this country might have become part of the Greco-Roman civilization, which it did not. It was arguable whether the results of this still persisted. It was frequently said that the Tartar invasions were stopped by the lack of grass in Bavaria to feed the horses of the invaders. If this were so it had undoubtedly saved European civilization. Mr. Binney referred to the lecturer's mention of the lemming, a creature which had always interested him and was peculiarly appropriate nowadays as an emblem of human progress. After making some observations on the position in the Far East, and the relations between different races, Mr. Binney concluded by saying how much the *Society* were indebted to Dr. Bertram for his lecture.

THE PLAIN VIEW

4A INVERNESS PLACE, LONDON, W.2

A Quarterly journal concerned with human relations and with the quality of living

Edited by H. J. BLACKHAM

Editorial Advisory Panel

Gilbert Murray, O.M., Bertrand Russell, O.M., F.R.S., Lord Chorley, Sir Richard Gregory, BT., F.R.S., Barbara Wootton

●

4s. 6d. *per annum, post free*

WRITE FOR SPECIMEN COPY